Application of the Lake Okeechobee Regulation Schedule (LORS2008) on 11/30/2015 (Developing El Nino Condition)

Lake Okeechobee Net Inflow Outlook:

The Lake Okeechobee Net Inflow Outlook has been computed using 4 methods: Croley's method[1], the SFWMD empirical method[2], a sub-sampling of El Nino years[3] and a sub-sampling of cold years of the Atlantic Multi-decadal Oscillation (AMO) in combination with ENSO El Nino years[4]. The results for Croley's method and the SFWMD empirical method are based on the CPC Outlook.

Table of the Lake Okeechobee Net Inflow Outlooks in feet of equivalent depth. All methods are updated on a weekly basis with observed net inflow for the current month.

Season	Croley's Method[1*]		SFWMD Empirical Method[2]		Sub-sampling of ENSO El Nino Years[3]		Sub-sampling of AMO Warm + ENSO El Nino Years[4]	
	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition	Value (ft)	Condition
Current (Nov-Apr)	N/A	N/A	0.83	Normal	1.70	Wet	2.19	Very Wet
Multi Seasonal (Nov-Oct)	N/A	N/A	3.11	Wet	3.97	Wet	6.13	Very Wet

*Croley's Method Not Produced For This Report

See Seasonal and Multi-Seasonal tables for the classification of Lake Okeechobee Outlooks.

The recommended methods and values for estimating the Lake Okeechobee Net Inflow Outlook are shaded and should be used in the LORS2008 Release Guidance Flow Charts.

Tributary Hydrologic Conditions Graph:

3359 cfs 14-day running average for Lake Okeechobee Net Inflow through 11/30/2015.
According to the classification in Tributary Hydrologic Conditions table, this condition is Wet.

-0.82 for Palmer Index on 11/29/2015.
According to the classification in Tributary Hydrologic Conditions table, this condition is Normal.

The wetter of the two conditions above is **Wet**.

LORS2008 Classification Tables:

Lake Okeechobee Stage on 11/30/2015

Lake Okeechobee Stage: **14.48 feet**

USACE Report for Lake Okeechobee

Lake Okeechobee Stage Hydrograph

Lake Okeechobee Management Zone/Band		Bottom Elevation (feet, NGVD)	Current Lake Stage
High Lake Management Band		17.25	
Operational Band	High sub-band	16.88	
	Intermediate sub-band	16.25	
	Low sub-band	14.50	
Base Flow sub-band		12.74	← 14.48
Beneficial Use sub-band		12.41	
Water Shortage Management Band			

Part C of LORS2008: Discharge to WCA's

Release Guidance Flow Chart Outcome: Up to Maximum Releases to the WCAs if Desirable or with Minimum Everglades Impacts

Part D of LORS2008: Discharge to Tidewater

Release Guidance Flow Chart Outcome: S-79 up to 450 cfs and S-80 up to 200 cfs

Technical Input Summaries from:

- **Lake Okeechobee Division**
- **Coastal Ecosystems**
- **Everglades Ecosystems Division**
- **Water Supply Department**
- **Water Resource Management Release Recommendation**
- **Kissimmee Watershed Environmental Conditions**
- **Operations Department**

Back to Lake Okeechobee Operations Main Page

Back to U.S. Army Corps of Engineers LORSS Homepage

LORS2008 Implementation on 11/30/2015 (ENSO Neutral Condition):

Water Supply Department Technical Input

Water Supply Outlook:

District wide, Raindar rainfall 0.11 inches for the week ending 11/30/2015. Lake stage on 11/30/2015 is 14.48 ft, down 0.02 ft from last week.
The updated November 2015 SFWMM Dynamic Position Analysis percentile graph and tracking chart for Lake Okeechobee show that the lake stage is in the Base Flow Operational Sub-Band.

The LORS2008 tributary indices are classified as **Wet**. The PDSI indicates normal condition and the LONIN is Wet. The classification is based on the wetter of the two.

Water Supply Risk Evaluation

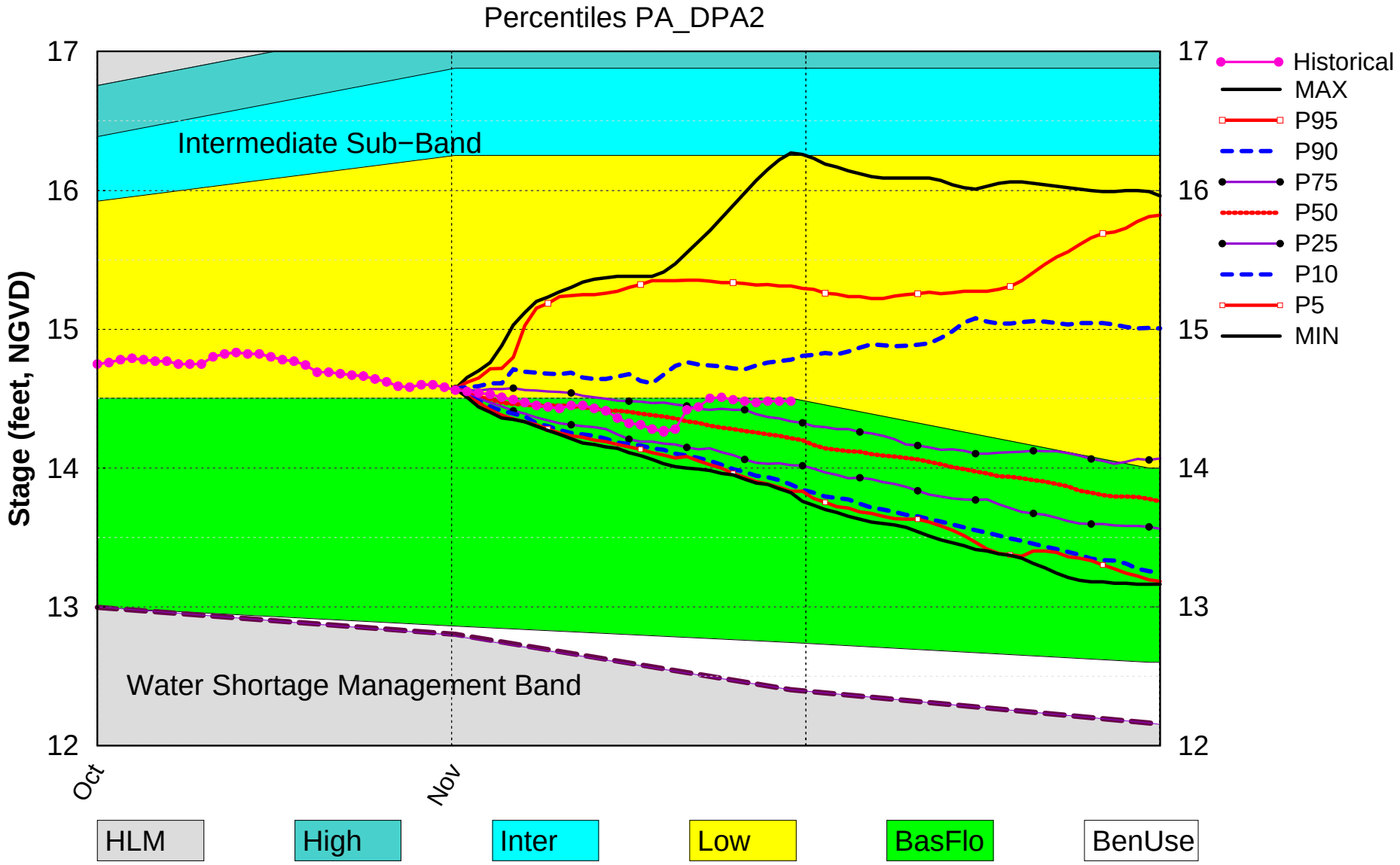
Area	Indicator	Value	Color Coded Scoring Scheme
LOK	Projected LOK Stage for the next two months	Base Flow Sub-Band	M
	Palmer Index for LOK Tributary Conditions	-0.82 (Normal)	L
	CPC Precipitation Outlook	1 month: Above Normal	L
		3 months: Above Normal	L
	LOK Seasonal Net Inflow Forecast	1.70 ft (Normal to Extremely Wet)	L
	AMO warm/El Nino		
	LOK Multi-Seasonal Net Inflow Forecast	3.97 ft (Wet)	L
	AMO warm/El Nino		
WCAs	WCA 1: Site 1-7,1-8T, & 1-9	(16.95 ft)	L
	WCA 2A: Site 2-17 HW	(12.55 ft)	L
	WCA-3A: 3 Station Average (Site 63 and 65)	(10.21 ft)	L
LEC	Service Area 1	Year-Round Irrigation Rule in effect	L
	Service Area 2	Year-Round Irrigation Rule in effect	L
	Service Area 3	Year-Round Irrigation Rule in effect	L

Note: The water supply risk classification based on the Palmer index, as well as the LOK seasonal and multi-seasonal net inflow forecasts use slightly different classification intervals than those used by the 2008-LORS for classifying the tributary hydrologic condition (THC).

Back to Lake Okeechobee Operations Main Page

Back to U.S. Army Corps of Engineers LORSS Homepage

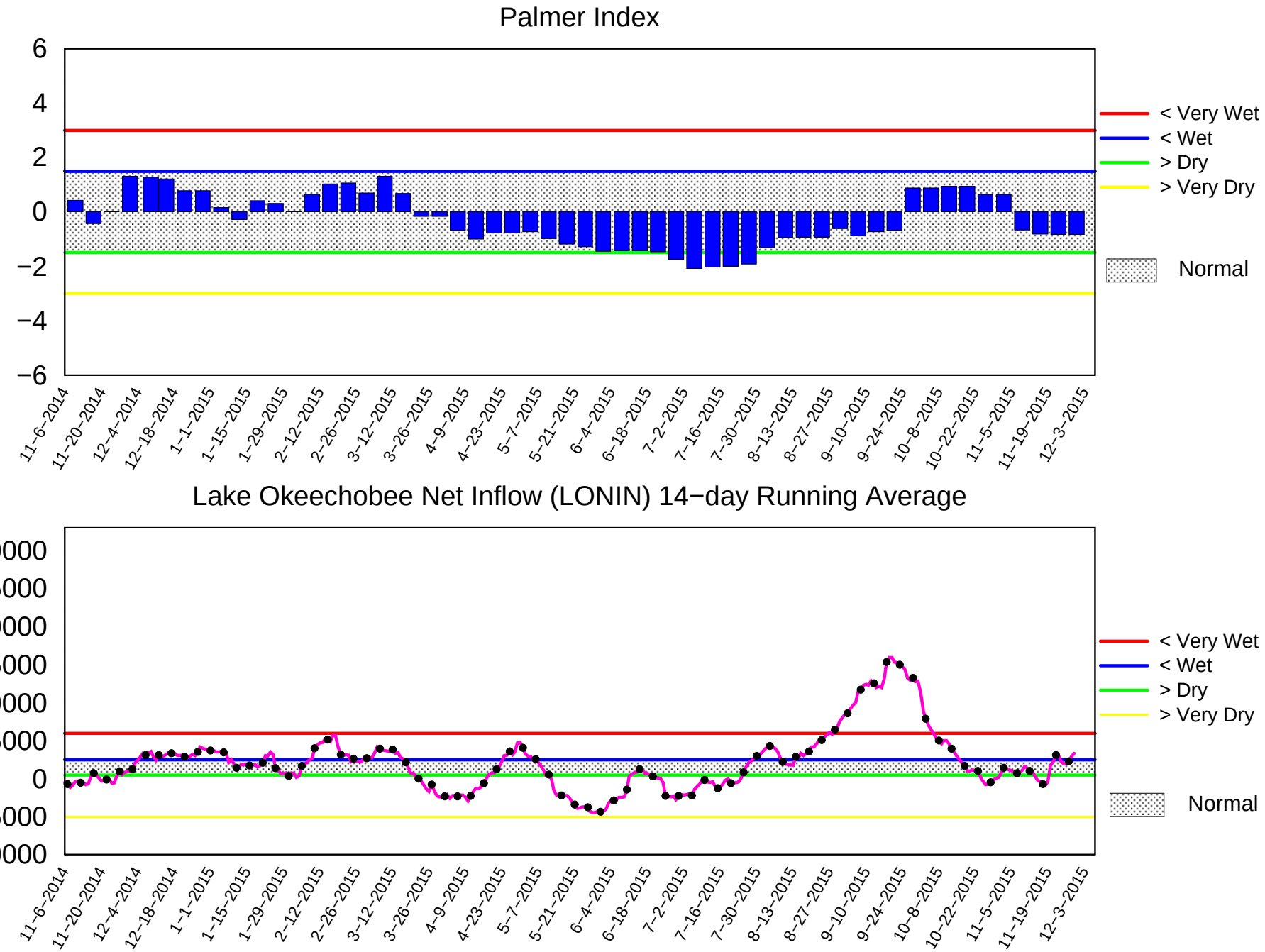
Lake Okeechobee SFWMM Nov 2015 Dynamic Position Analysis



(See assumptions on the Position Analysis Results website)

Mon Nov 30 11:16:54 EST 2015

Tributary Basin Condition Indicators as of November 30 2015



Mon Nov 30 11:16:34 EST 2015

2008 LORS

Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas

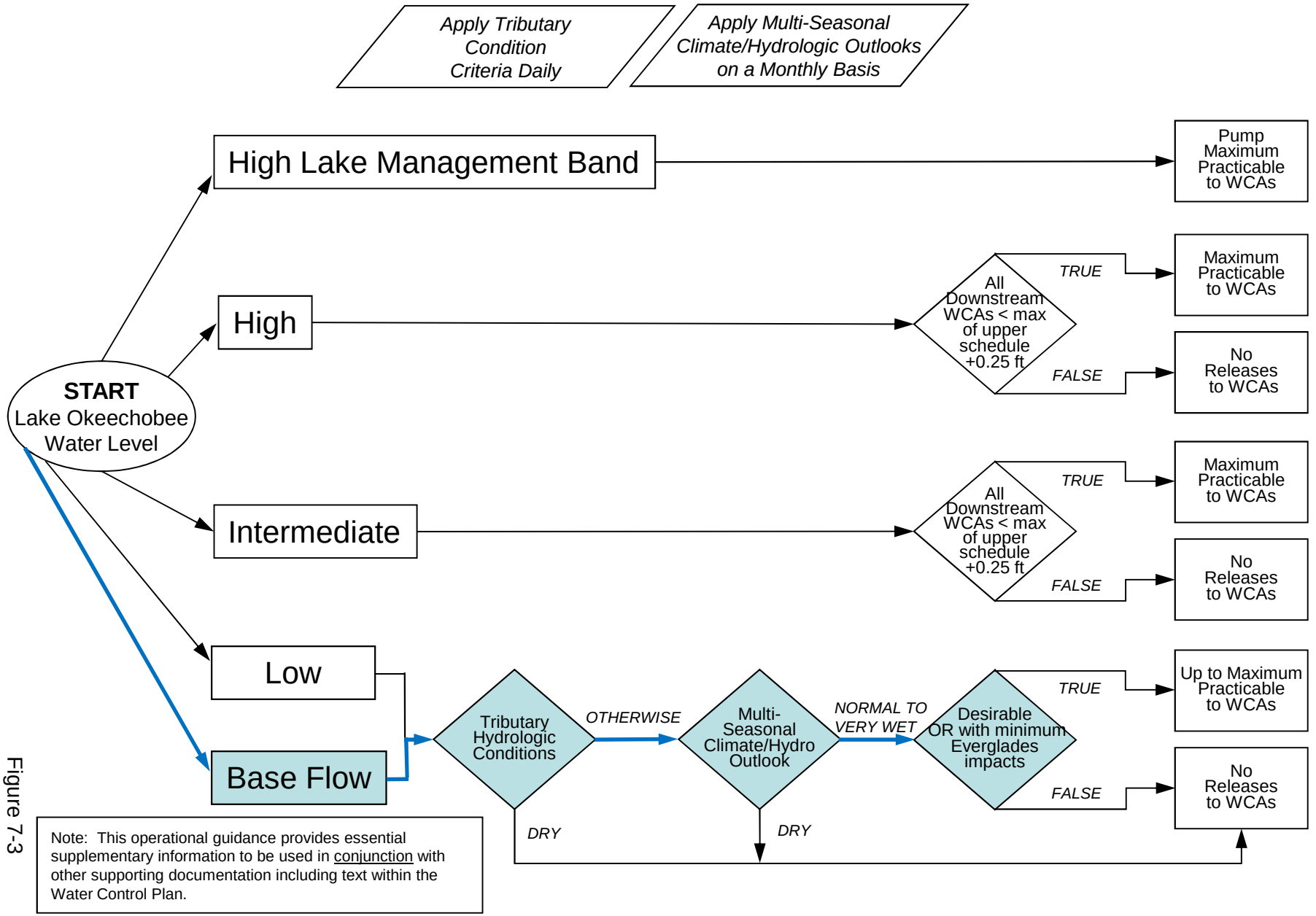
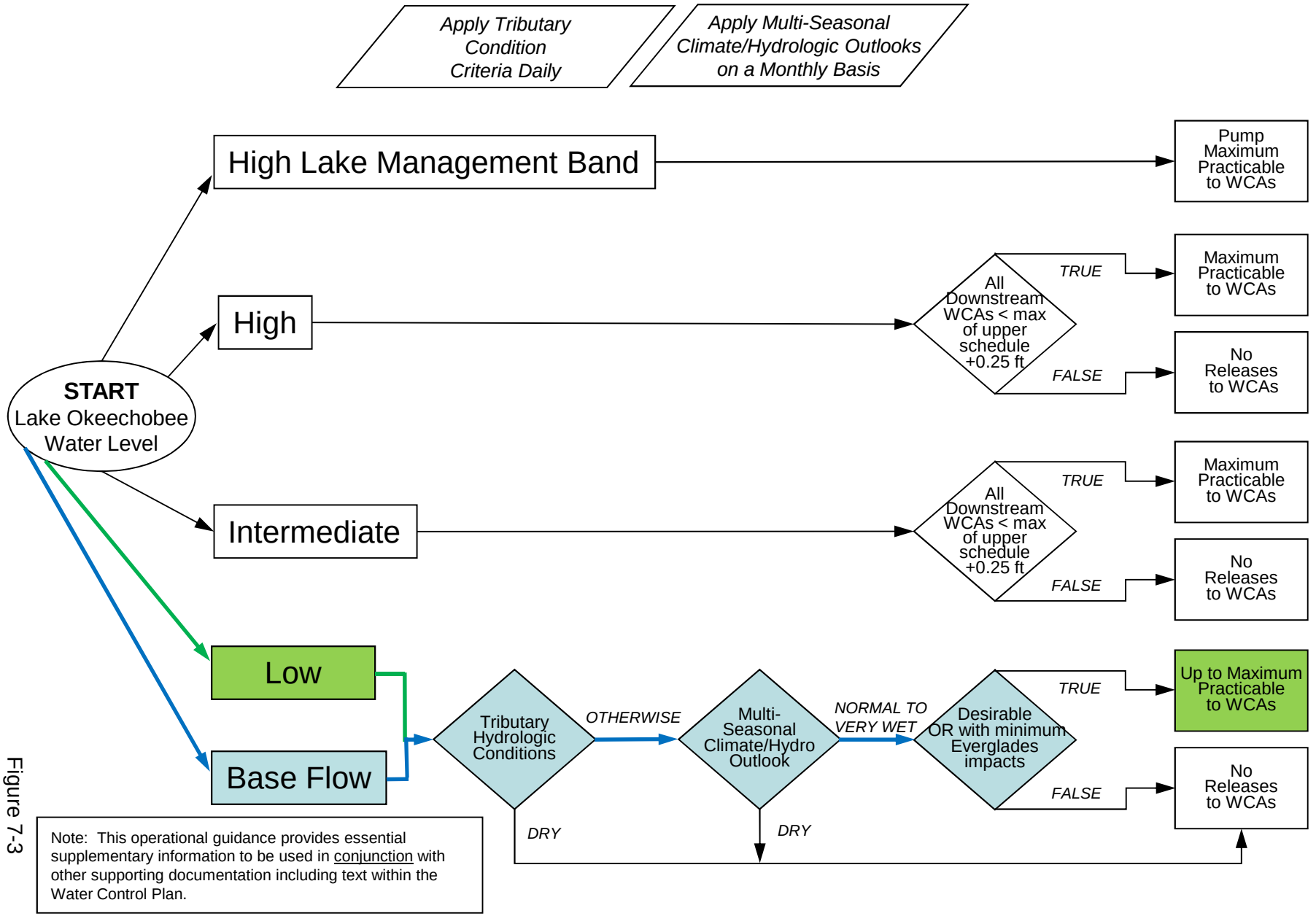


Figure 7-3

2008 LORS FORECAST

Part C: Establish Allowable Lake Okeechobee Releases to the Water Conservation Areas

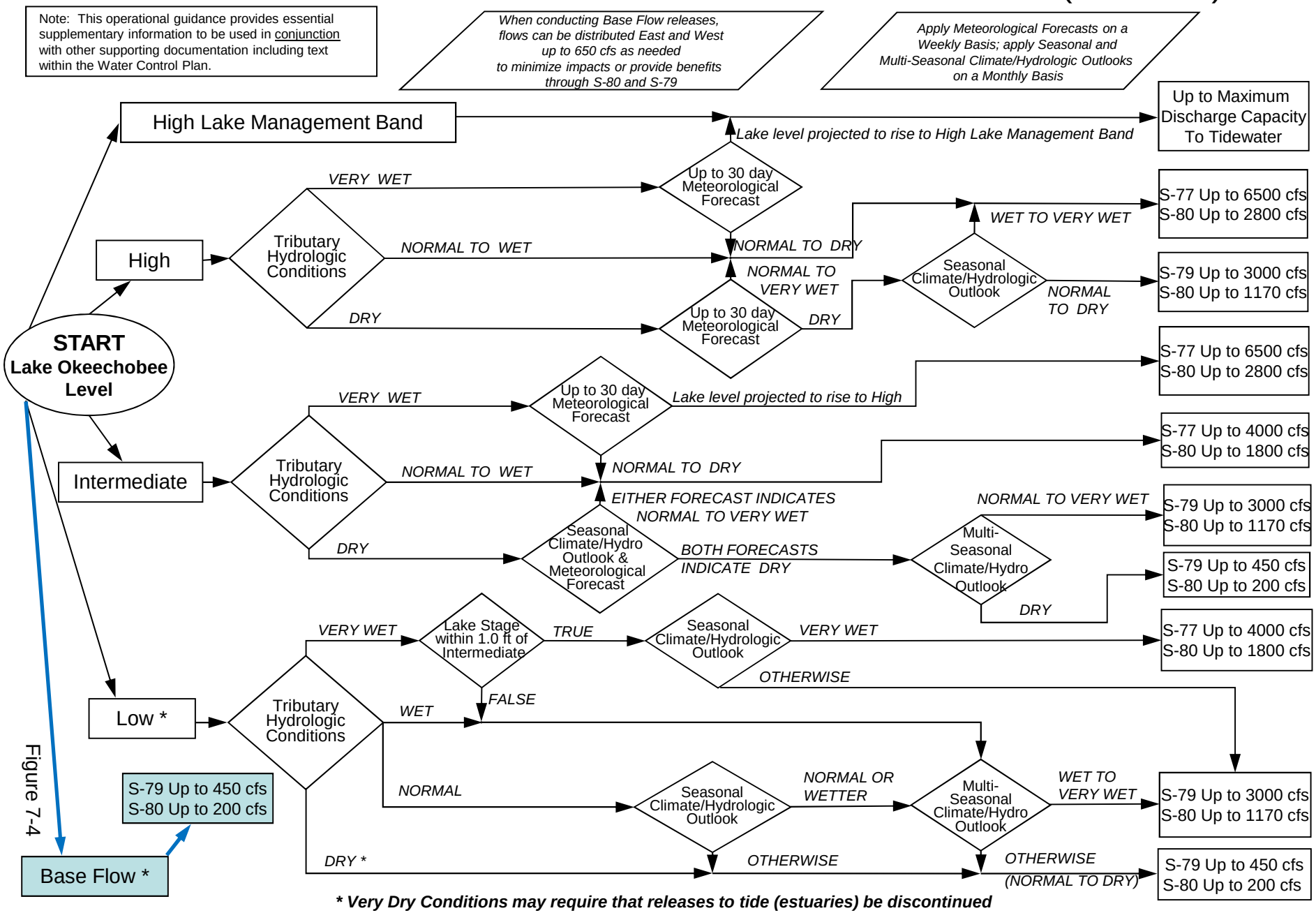


Note: This operational guidance provides essential supplementary information to be used in conjunction with other supporting documentation including text within the Water Control Plan.

Figure 7-3

2008 LORS

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)



2008 LORS FORECAST

Part D: Establish Allowable Lake Okeechobee Releases to Tide (Estuaries)

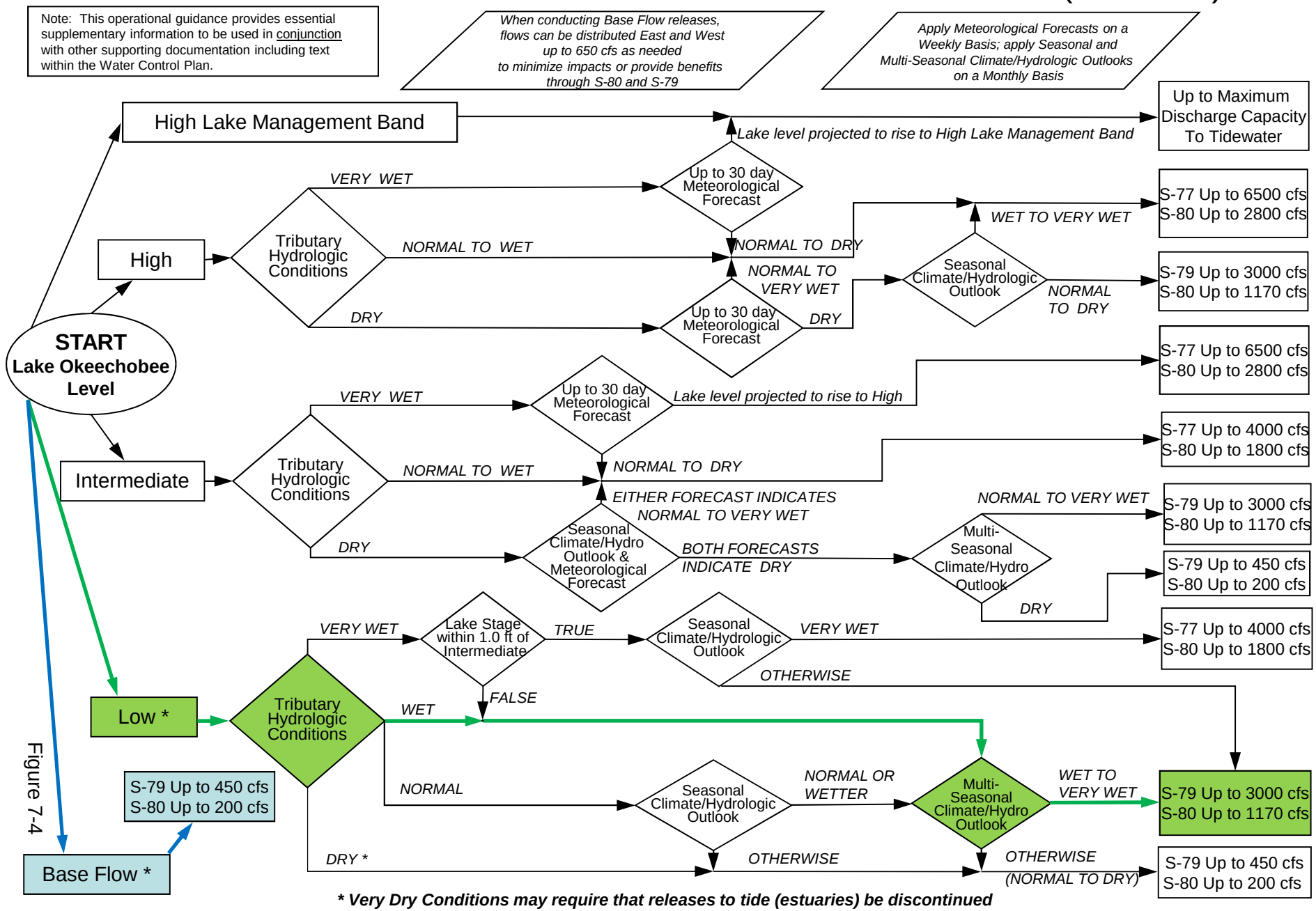
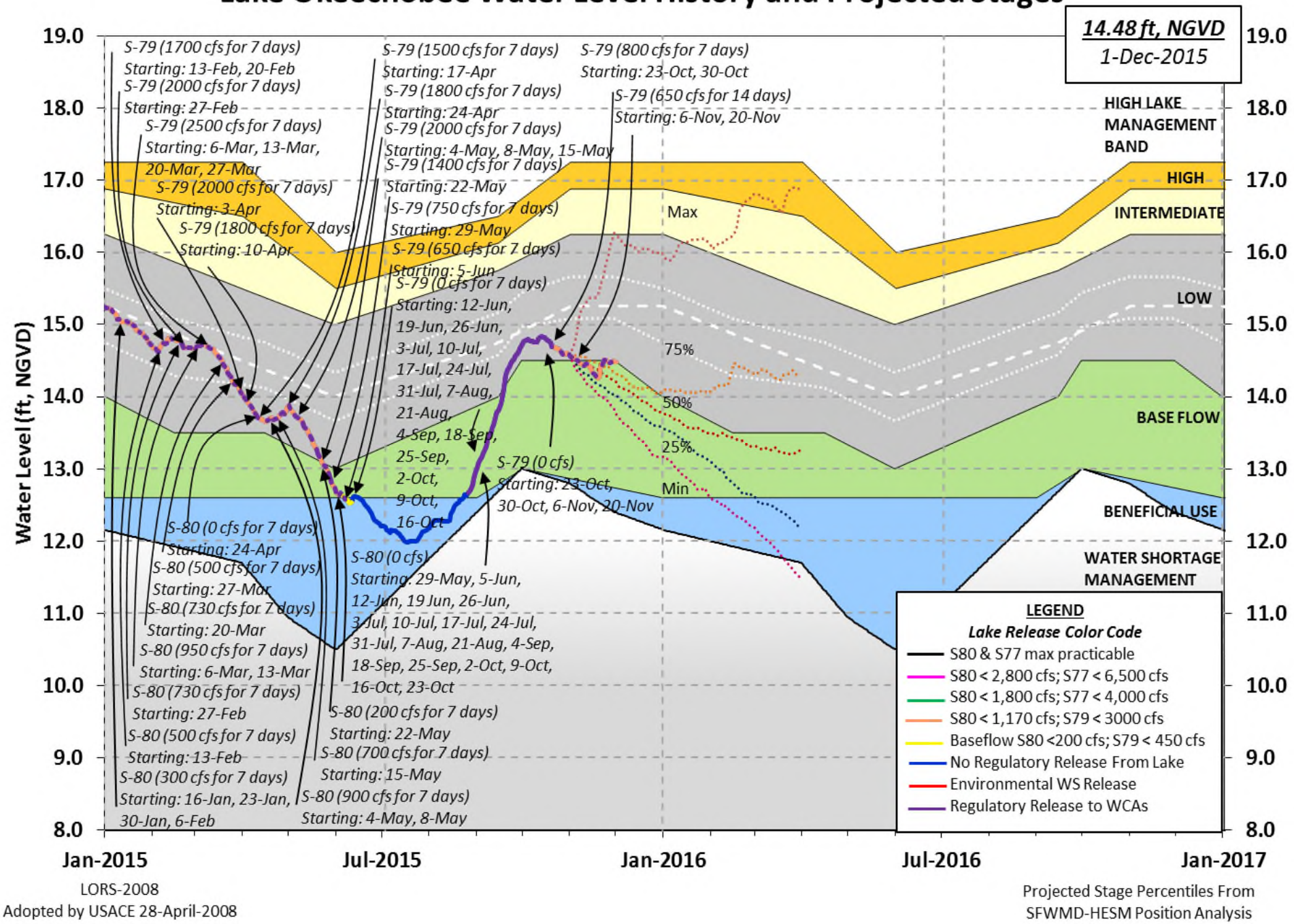


Figure 7-4

Lake Okeechobee Water Level History and Projected Stages



LORS-2008
Adopted by USACE 28-April-2008

Projected Stage Percentiles From
SFWMD-HESM Position Analysis

U. S. Army Corps of Engineers, Jacksonville District
Lake Okeechobee and Vicinity Report
** Preliminary Data - Subject to Revision **

Data Ending 2400 hours 29 NOV 2015

Okeechobee Lake Regulation	Elevation (ft-NGVD)	Last Year (ft-NGVD)	2YRS Ago (ft-NGVD)
*Okeechobee Lake Elevation	14.48	15.58	14.67 (Official Elv)

Bottom of High Lake Mngmt= 17.25 Top of Water Short Mngmt= 12.41
Currently in Operational Management Band

Simulated Average LORS2008 [1965-2000] 13.79
Difference from Average LORS2008 0.69

29NOV (1965-2007) Period of Record Average 14.85
Difference from POR Average -0.37

Today Lake Okeechobee elevation is determined from the 4 Int & 4 Edge stations

++Navigation Depth (Based on 2007 Channel Condition Survey) Route 1 ÷ 8.42'
++Navigation Depth (Based on 2008 Channel Condition Survey) Route 2 ÷ 6.62'
Bridge Clearance = 50.07'

---

4 Interior and 4 Edge Okeechobee Lake Average (Avg-Daily values):

L001	L005	L006	LZ40	S4	S352	S308	S133
14.24	14.52	14.56	14.46	14.65	14.68	14.44	14.32

*Combination Okeechobee Avg-Daily Lake Average = 14.48 (*See Note)

Okeechobee Inflows (cfs):

S65E	926	C5	0	Fisheating Cr	330
S154	12	S191	0	S135 Pumps	0
S84	0	S133 Pumps	0	S2 Pumps	0
S84X	715	S127 Pumps	0	S3 Pumps	0
S71	362	S129 Pumps	0	S4 Pumps	0
S72	114	S131 Pumps	0		

Total Inflows: 2459

Okeechobee Outflows (cfs):

S135 Culverts	0	S354	0	S77	619 (Used)
S127 Culverts	-NR-	S351	0	S77Below	452 (NOT USED)

```
  S129 Culverts     0      S352              0      S308              2
(Used)
  S131 Culverts     0      L8 Canal Pt     210      S308Below        40 (NOT
USED)
Total Outflows:    831

****S77 Structure outflow is being used to compute Total Outflow.
****S308 Structure outflow is being used to compute Total Outflow.

Okeechobee Pan Evaporation (inches):
  S77            0.17      S308           0.17
  Average Pan Evap x 0.75 Pan Coefficient =  0.13" =  0.01'

Lake Average Precipitation using NEXRAD: =  -NR-" =  -NR-'

Evaporation - Precipitation:             =  -NR-" =  -NR-'
Evaporation - Precipitation using Lake Area of 730 square miles
  is equal to   -NR-
Lake Okeechobee (Change in Storage) Flow is      0 cfs or      0 AC-FT
_____________________________________________________________________________
_
_____________________________________________________________________________
_


Note: Headwater, tailwater, and stage values below are instantaneous values
      unless otherwise specified.

             Headwater Tailwater         ----------- Gate Positions ---------
---
             Elevation Elevation  Disch   #1   #2   #3   #4   #5   #6   #7
#8
             (ft-msl)  (ft-msl)   (cfs)  (ft) (ft) (ft) (ft) (ft) (ft) (ft)
(ft)
                                (I) see note at bottom
North East Shore
  S133 Pumps:  13.73     14.33       0      0    0    0    0    0  (cfs)
  S193:        ______
  S191:        18.80     14.34       0    0.0  0.0  0.0
  S135 Pumps:  13.72     14.37       0      0    0    0    0       (cfs)
  S135 Culverts:                     0   -NR- -NR-

North West Shore
  S65E:        21.02     14.16     926    0.0  0.0  0.0  0.0  0.0  0.0
  S127 Pumps:  13.52     14.41       0      0    0    0    0    0  (cfs)
  S127 Culvert:                    -NR-   -NR-

  S129 Pumps:  13.04     14.47       0      0    0    0           (cfs)
  S129 Culvert:                      0    0.0

  S131 Pumps:  13.22     14.49       0      0    0               (cfs)
  S131 Culvert:                      0

  Fisheating Creek
    nr Palmdale          31.78     330
    nr Lakeport          ______
```

```
  C5:          14.55    14.57      0    0.0  0.0  0.0

South Shore
  S4 Pumps:    11.21     14.60       0      0    0    0            (cfs)
  S169:        14.61     11.20       0    0.0  0.0  0.0
  S310:        14.53                 1
  S3 Pumps:    10.37     14.65       0      0    0    0            (cfs)
  S354:        14.65     10.37       0    0.0  0.0
  S2 Pumps:    10.18     14.59       0      0    0    0    0       (cfs)
  S351:        14.59     10.18       0    0.0  0.0  0.0
  S352:        14.67     10.10       0    0.0  0.0
  C10A:         -NR-     13.73            0.0   8.5   8.5   8.5   8.5
  L8 Canal PT            13.51     210
```

S351 and S352 Temporary Pumps/S354 Spillway

```
  S351:        10.18     14.59       0  -NR--NR--NR--NR--NR--NR-
  S352:        10.10     14.67       0  -NR--NR--NR--NR-
  S354:        10.37     14.65       0  -NR--NR--NR--NR-
```

```
Caloosahatchee River (S77, S78, S79)
  S47B:        14.01     11.18            0.0  0.0
  S47D:        11.14     11.12      21    5.0
  S77:
    Spillway and Sector Flow:
               14.30     11.18     613    2.0  0.0  0.0  1.5
    Flow Due to Lockages+:            6

  S77 Below USGS Flow Gage          452

  S78:
    Spillway and Sector Flow:
               11.00      3.02     548    0.5  0.5  0.5  0.5
    Flow Due to Lockages+:           21

  S79:
    Spillway and Sector Flow:
                3.17      1.33     846    0.0  0.0  0.0  1.0  1.0  1.0  0.0
0.0
    Flow Due to Lockages+:            8
    Percent of flow from S77         72%
    Chloride            (ppm)     51


St. Lucie Canal (S308, S80)
  S308:
    Spillway and Sector Flow:
               14.45     13.43       0    0.0  0.0  0.0  0.0
    Flow Due to Lockages+:            2

  S308 Below USGS Flow Gage          40
  S153:        18.61     13.25      52    0.5  0.0
  S80:
    Spillway and Sector Flow:
               13.56      1.81       0    0.0  0.0  0.0  0.0  0.0  0.0  0.0
```

Flow Due to Lockages+: 26
Percent of flow from S308 NA %

Steele Point Top Salinity (mg/ml) ****
Steele Point Bottom Salinity (mg/ml) ****

Speedy Point Top Salinity (mg/ml) ****
Speedy Point Bottom Salinity (mg/ml) ****

+ Flow Due to lockages is computed utilizing average daily headwater and tailwater along with total number of lockages for the day to calculate a volume which is then converted to an average discharge in cfs.

Daily Precipitation Totals	1-Day (inches)	3-Day (inches)	7-Day (inches)	----- Wind ----- Direction (Degø)	Speed (mph)
S133 Pump Station:	-NR-	0.05	0.19		
S193:	-NR-	0.00	0.00	-NR-	-NR-
Okeechobee Field Station:	-NR-	0.00	0.00		
S135 Pump Station:	-NR-	0.11	0.29		
S127 Pump Station:	-NR-	0.01	0.02		
S129 Pump Station:	-NR-	0.01	0.02		
S131 Pump Station:	-NR-	0.02	0.02		
S77:	0.00	0.00	0.01	33	2
S78:	0.00	0.03	0.03	344	1
S79:	0.00	0.00	0.00	113	1
S4 Pump Station:	-NR-	0.00	0.00		
Clewiston Field Station:	-NR-	0.00	0.00		
S3 Pump Station:	-NR-	0.00	0.00		
S2 Pump Station:	-NR-	0.02	0.02		
S308:	*******	*******	*******	339	0
S80:	0.01	0.09	0.83	353	2
Okeechobee Average (Sites S78, S79 and S80 not included)	*******	6494.94	*******		
Oke Nexrad Basin Avg	-NR-	0.02	0.04		

Okeechobee Lake Elevations	29 NOV 2015	14.48	Difference from 29NOV15
29NOV15 -1 Day =	28 NOV 2015	14.48	0.00
29NOV15 -2 Days =	27 NOV 2015	14.48	0.00
29NOV15 -3 Days =	26 NOV 2015	14.47	-0.01
29NOV15 -4 Days =	25 NOV 2015	14.48	0.00
29NOV15 -5 Days =	24 NOV 2015	14.49	0.01
29NOV15 -6 Days =	23 NOV 2015	14.51	0.03
29NOV15 -7 Days =	22 NOV 2015	14.50	0.02
29NOV15 -30 Days =	30 OCT 2015	14.58	0.10
29NOV15 -1 Year =	29 NOV 2014	15.58	1.10
29NOV15 -2 Year =	29 NOV 2013	14.67	0.19

Long Term Mean 30day Avearge ET for Lake Alfred (Inches) = -NR-

Lake Okeechobee Net Inflow (LONIN)

		Average Flow over the previous 14 days			Avg-Daily Flow
29NOV15	Today =	29 NOV 2015	3227	MON	823
29NOV15	-1 Day =	28 NOV 2015	2688	SUN	738
29NOV15	-2 Days =	27 NOV 2015	1991	SAT	-NR-
29NOV15	-3 Days =	26 NOV 2015	1738	FRI	-1648
29NOV15	-4 Days =	25 NOV 2015	1713	THU	-1808
29NOV15	-5 Days =	24 NOV 2015	2008	WED	-4083
29NOV15	-6 Days =	23 NOV 2015	2847	TUE	2322
29NOV15	-7 Days =	22 NOV 2015	2747	MON	13367
29NOV15	-8 Days =	21 NOV 2015	1836	SUN	4801
29NOV15	-9 Days =	20 NOV 2015	1396	SAT	29942
29NOV15	-10 Days =	19 NOV 2015	-826	FRI	4583
29NOV15	-11 Days =	18 NOV 2015	-1233	THU	-3068
29NOV15	-12 Days =	17 NOV 2015	-1096	WED	-4444
29NOV15	-13 Days =	16 NOV 2015	-732	TUE	427

S65E

		Average Flow over previous 14 days			Avg-Daily Flow
29NOV15	Today=	29 NOV 2015	1104	MON	926
29NOV15	-1 Day =	28 NOV 2015	1078	SUN	669
29NOV15	-2 Days =	27 NOV 2015	1082	SAT	1140
29NOV15	-3 Days =	26 NOV 2015	1051	FRI	918
29NOV15	-4 Days =	25 NOV 2015	1034	THU	1267
29NOV15	-5 Days =	24 NOV 2015	1009	WED	1500
29NOV15	-6 Days =	23 NOV 2015	979	TUE	1618
29NOV15	-7 Days =	22 NOV 2015	943	MON	1822
29NOV15	-8 Days =	21 NOV 2015	875	SUN	1100
29NOV15	-9 Days =	20 NOV 2015	863	SAT	930
29NOV15	-10 Days =	19 NOV 2015	875	FRI	740
29NOV15	-11 Days =	18 NOV 2015	917	THU	-NR-
29NOV15	-12 Days =	17 NOV 2015	959	WED	-NR-
29NOV15	-13 Days =	16 NOV 2015	1005	TUE	619

Lake Okeechobee Outlets Last 14 Days

DATE	S-77 Discharge (0700-2100) (AC-FT)	S-77 Discharge (ALL DAY) (AC-FT)	Below S-77 Discharge (ALL-DAY) (AC-FT)	S-78 Discharge (0700-2100) (AC-FT)	S-78 Discharge (ALL DAY) (AC-FT)	S-79 Discharge (ALL DAY) (AC-FT)
29 NOV 2015	736	-NA-	897	661	1129	1693
28 NOV 2015	630	-NA-	598	554	971	2265
27 NOV 2015	398	-NA-	446	550	795	1154
26 NOV 2015	352	-NA-	530	191	368	1217
25 NOV 2015	237	350	347	207	455	1518
24 NOV 2015	0	9	-48	413	790	1458
23 NOV 2015	0	11	-58	588	1103	2934
22 NOV 2015	62	365	332	661	1100	3942

21 NOV 2015	406	-NA-	444	536	755	2061
20 NOV 2015	0	6	-118	186	425	1327
19 NOV 2015	0	-NA-	239	160	387	386
18 NOV 2015	634	-NA-	1137	162	511	818
17 NOV 2015	663	-NA-	888	287	647	1339
16 NOV 2015	558	-NA-	1239	350	1039	1665

DATE	S-310 Discharge (ALL DAY) (AC-FT)	S-351 Discharge (ALL DAY) (AC-FT)	S-352 Discharge (ALL DAY) (AC-FT)	S-354 Discharge (ALL DAY) (AC-FT)	L8 Canal Pt Discharge (ALL DAY) (AC-FT)
29 NOV 2015	2	0	0	0	416
28 NOV 2015	11	0	0	0	407
27 NOV 2015	0	0	0	-NR-	402
26 NOV 2015	-0	0	0	0	388
25 NOV 2015	-5	0	0	0	372
24 NOV 2015	-96	0	0	0	401
23 NOV 2015	-204	0	0	0	405
22 NOV 2015	-204	0	0	0	359
21 NOV 2015	-140	0	0	0	393
20 NOV 2015	-178	0	0	0	389
19 NOV 2015	41	0	0	0	346
18 NOV 2015	14	383	87	0	330
17 NOV 2015	54	892	956	224	347
16 NOV 2015	84	1489	1154	458	369

DATE	S-308 Discharge (ALL DAY) (AC-FT)	Below S-308 Discharge (ALL-DAY) (AC-FT)	S-80 Discharge (ALL-DAY) (AC-FT)
29 NOV 2015	3	80	52
28 NOV 2015	1	74	42
27 NOV 2015	1	41	39
26 NOV 2015	1	235	17
25 NOV 2015	1	137	28
24 NOV 2015	1	186	134
23 NOV 2015	1	30	718
22 NOV 2015	-0	-63	1370
21 NOV 2015	0	129	68
20 NOV 2015	0	98	46
19 NOV 2015	0	123	42
18 NOV 2015	1	628	41
17 NOV 2015	1	399	40
16 NOV 2015	1	739	51

*** NOTE: 1) Discharge from (0700-2100) is computed using Spillway and Sector
Gate Discharges from 0700 hrs to 2100 hrs.
2) Discharge (ALL DAY) is computed using Spillway, Sector Gate and
Lockages Discharges from 0015 hrs to 2400 hrs.

(I) - Flows preceeded by "I" signify an instantaneous
flow computed from the single value reported for the day

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* On 11 May 1999, Lake Okeechobee Elevation was switched from
Instantaneous 2400 value to an average-daily lake average.
On 14 Mar 2001, due to the isolation of various gages within the standard
10 stations, the average of the interior 4 station gages was used
as the Lake Okeechobee Elevation.
On 05 November 2010, Lake Okeechobee Elevation was switched to a 9 gage
mix of interior and edge gages to obtain a more reliable representation
of the lake level.
On 09 May 2011, Lake Okeechobee Elevation was switched to a 8 gage
mix of interior and edge gages to obtain a more reliable representation
of the lake level due to isolation of S135 from low lake levels.
Today Lake Okechobee elevation is determined from the 4 Int & 4 Edge stations
++ For more information see the Jacksonville District Navigation website
at http://www.saj.usace.army.mil/
$ For information regarding Lake Okeechobee Service Area water restrictions
please refer to www.sfwmd.gov

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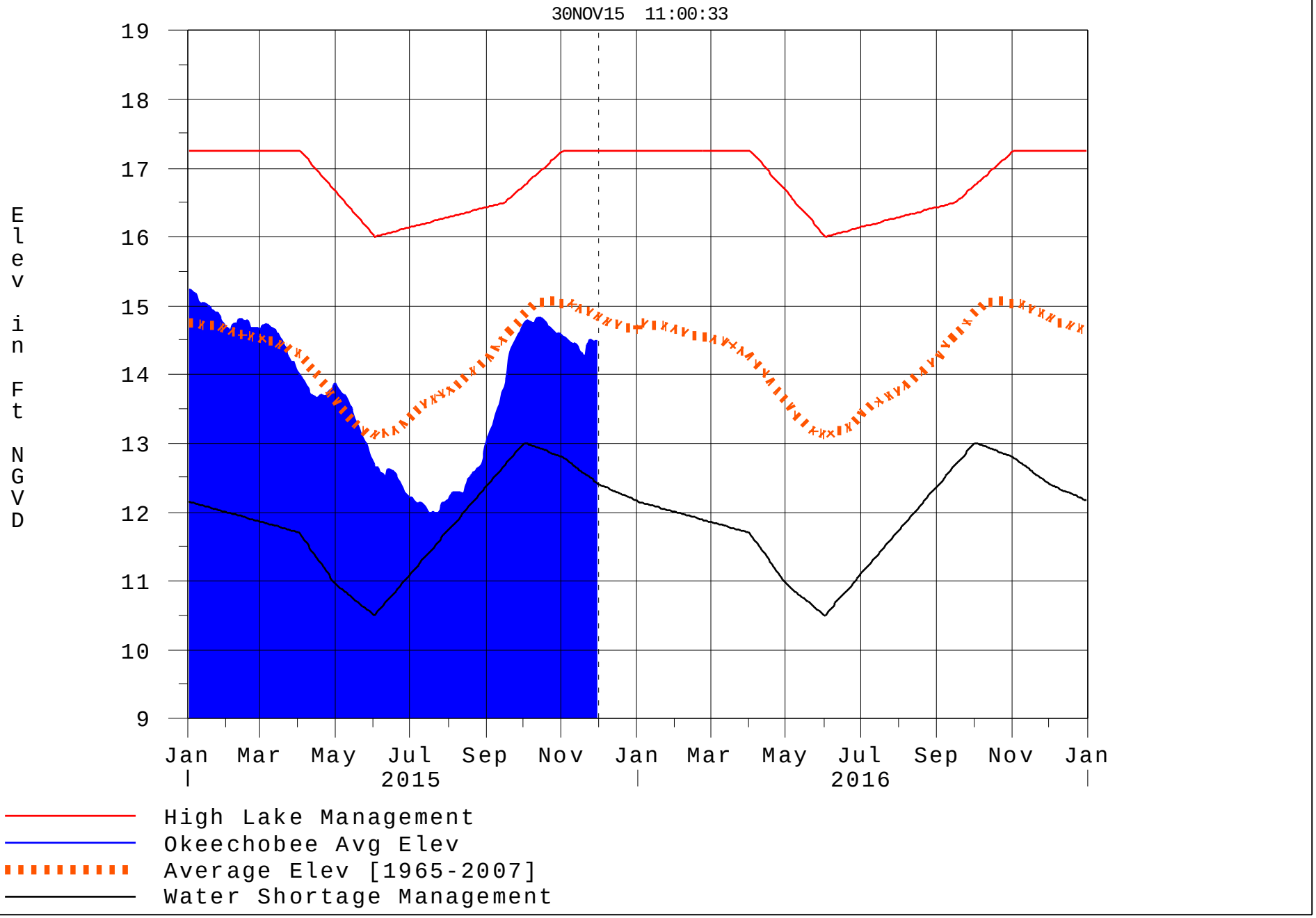
Report Generated 30NOV2015 @ 11:06 ** Preliminary Data - Subject to Revision **

Lake Okeechobee



Classification Tables

Supplemental Tables used in conjunction with the LORS2008 Release

Guidance Flow Charts

- Class Limits for Tributary Hydrologic Conditions

Table K-2 in the Lake Okeechobee Water Control Plan

- 6-15 Day Precipitation Outlook Categories

Table ?? in the Lake Okeechobee Water Control Plan

- Classification of Lake Okeechobee Net Inflow for Seasonal Outlook

Table K-3 in the Lake Okeechobee Water Control Plan

- Classification of Lake Okeechobee Net Inflow for Multi-Seasonal Outlook

Table K-4 in the Lake Okeechobee Water Control Plan

Back to Lake Okeechobee Operations Main Page

Back to U.S. Army Corps of Engineers Lake Okeechobee Operations Homepage

Tributary Hydrologic Classification*	Palmer Index Class Limits	2-wk Mean L.O. Net Inflow Class Limits
Very Wet	3.0 or greater	Greater >= 6000 cfs
Wet	1.5 to 2.99	2500 - 5999 cfs
Near Normal	-1.49 to 1.49	500 - 2499 cfs
Dry	-2.99 to -1.5	-5000 – 500 cfs
Very Dry	-3.0 or less	Less than -5000 cfs

* use the wettest of the two indicators

Classification of Lake Okeechobee Net Inflow Seasonal Outlook*

Lake Net Inflow Prediction [million acre-feet]	Equivalent Depth** [feet]	Lake Okeechobee Net Inflow Seasonal Outlook
> 0.93	> 2.0	Very Wet
0.71 to 0.93	1.51 to 2.0	Wet
0.35 to 0.70	0.75 to 1.5	Normal
< 0.35	< 0.75	Dry

****Volume-depth conversion based on average lake surface area of 467,000 acres**

Classification of Lake Okeechobee Net Inflow Multi-Seasonal Outlook*

Lake Net Inflow Prediction [million acre-feet]	**Equivalent Depth** [feet]**	**Lake Okeechobee Net Inflow Multi-Seasonal Outlook**
> 2.0	> 4.3	Very Wet
1.18 to 2.0	2.51 to 4.3	Wet
0.5 to 1.17	1.1 to 2.5	Normal
< 0.5	< 1.1	Dry

****Volume-depth conversion based on average lake surface area of 467,000 acres**

6-15 Day Precipitation Outlook Categories*

6-15 Day Precipitation Outlook Categories	WSE Decision Tree Categories
Above Normal	Wet to Very Wet
Normal	Normal
Below Normal	Dry

*** Corresponds to Table 7-6 in the Lake Okeechobee Water Control Plan**

Under Construction